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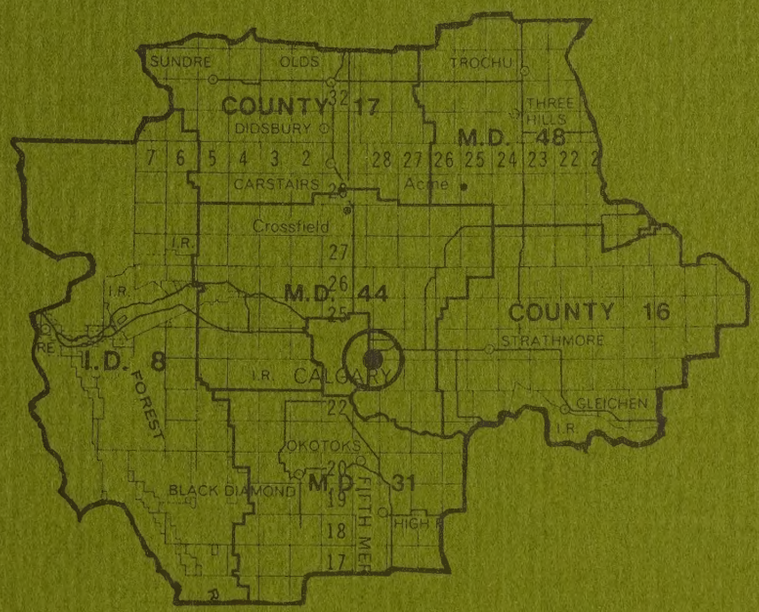
A CONSENSUS OF

COSTS AND RETURNS

TAME HAY
300 ACRES

960 ACRE FARM

CALGARY DISTRICT



SOUTH WEST ALBERTA

ECONOMICS DIVISION - ALBERTA DEPARTMENT OF AGRICULTURE

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A CONSENSUS OF COSTS AND RETURNS FOR BALED HAY PRODUCTION IN THE COCHRANE DISTRICT

by[1/]

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Alberta Department of Agriculture

[1/] With assistance from Marcel Maisonneuve, Agricultural Economist; Ted Ford, Farm Management Technician; and R. Wiens, former Regional Economist.

The author also wishes to acknowledge the assistance of the farmers in the Cochrane district who provided the basic data and to Dave Zukerman and Al Reimer, District Agriculturists, for their assistance in arranging this study and participation in gathering the data.

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THE CONSENSUS RESEARCH DATA (C.R.D.) TECHNIQUE [1/]

The C.R.D. or data sheet approach relies on group participation of interested farmers to arrive at a consensus of opinion on costs and returns. This consensus relates not area averages but rather typical figures for the group of producers who provided the data. This distinction is important since different production practices carried out in small pockets within a larger area are often not truly reflected in the average figures (i.e. hay baling in an area where putting loose hay into stacks is more common). Conversely, if within a given area there is a pocket of high livestock density where certain production practices (i.e. feeding) are different, then the specialized costs of that practice can bias the overall area average costs and render them less useful. For these and other reasons, averaged figures must be interpreted with the greatest of caution.

Consensus figures are therefore associated with the level of investment, management and cultural expertise of the participants within a particular geographic area. While care should be exercised when applying C.R.D. data to individual cases, the greatest advantage of the technique is that it can be specific (i.e. to the breed, ration or crop variety level), timely, locally oriented and based on the cumulative experience of farmers operating in that area.

1/ For more information on the C.R.D. technique, contact your Regional Economist, District Agriculturist or the Economics Division of the Alberta Department of Agriculture.

INTRODUCTION

Today's farming demands that cost and return information be available for all alternatives which the producer could consider when planning future production. The narrowing margin of profit has forced the farmer to keep a close eye on all production costs and expected returns. This report provides an estimate of costs and returns based on the consensus of a group of farmers in the district.

OBJECTIVES

This report was prepared to provide an estimate of costs of production and the expected returns for each crop. Such information can be an important guide in decision-making, but the reader should keep in mind that costs vary between producers because of differences in land and cultural practices. The farmer's own records are essential to determine what it actually costs to produce a crop on his particular farm.

This report can be useful for management decisions:

1. In selecting the enterprise or crop rotation yielding the highest returns.
2. In determining the amount of cash required to operate during a season.
3. In determining the amount of time expected to be spent on an enterprise.

4. For projecting the expense and income when considering new investments requiring credit.
5. In determining how the expenses and receipts should be shared in rental arrangements.
6. To compare to actual costs incurred in your farming enterprises.

SOURCE AND METHOD OF DATA COLLECTION

The information for the report was gathered from a group of farmers from the district. A day was spent with them discussing the direct costs involved, the complement of machinery needed to produce the crop and the cultural practices carried out. This information was compiled and costs calculated to determine the total cost of production for the crop.

CONTENTS OF REPORT AND DEFINITIONS

The report consists of a summary table (1) showing cash, non-cash, total costs and expected returns per acre based on the assumptions which follow. Also included is a separate table (2) detailing the costs and Gross Income on a per acre basis.

Table A provides a detailed breakdown of machinery, material, overhead and labour costs for hay production. Costs are separated into cash and non-cash categories and are associated with physical inputs such as hours per acre, pounds per acre, etc.

Table B shows returns to land, labour and management per acre at various yields and prices and also, the cash, non-cash and total costs per ton for the hay produced. Positive returns indicates that the yield and price combination results in enough gross income to pay all the other costs and have some left over for land and operator labour returns.

The Investment Schedule (Table C) gives the operating and ownership (fixed) costs for machinery. Operating costs include fuel, oil, grease and repairs. Ownership or fixed costs include interest and depreciation on land, supplies, buildings and equipment. These costs are allocated according to use and are expressed on a per acre basis.

Total Cash Costs Per Acre include hired labour, fuel, oil, repairs, seed, fertilizers, sprays, and all cash overhead such as taxes, insurance, and interest on operating capital. These costs must be covered in the short run. Operators comparing their cash costs to those in the C.R.D. should recognize that payments on land and equipment have been omitted. Higher cash costs per acre and per ton make it more difficult for producers to meet commitments in the short run when prices are low and market opportunities are weak. When marketing hay through livestock a producer should consider his cash costs per ton as the minimum value of the hay fed.

Total Non-Cash Costs Per Acre include depreciation, interest and operator's labour. Sufficient revenue should be obtained from the crop to pay for machinery depreciation so that it can be replaced when it wears out or becomes obsolete.

Total Costs Per Acre include all cash and non-cash costs. These must be covered in the long run. Returns that do not cover total costs will force the operator to take a lower return for his investment and labour or force him to shift his resources to more profitable activities.

Gross Cash Margin Per Acre or returns over cash costs is often used by producers to compare the profitability of various crops. Gross cash margin is the residue left to pay for the operator's labour and his equity in machinery, buildings and supplies. Consideration should be given to the cash returns that can be expected from crops since quotas and off-farm sales have an influence on this figure.

Return to Labour and Management is the amount left after all costs except operator's labour have been subtracted from expected returns. To compare to other enterprises, the operator should bring these returns to a common base such as returns per hour of labour and management.

ASSUMPTIONS SPECIFIC TO THIS STUDY

1. A dryland farm in the Cochrane area.

2. The farm considered consisted of 960 acres with the following rotation:

Hay (Brome-alfalfa)	300
Green feed	60
Oats (on stubble)	50
Oats (on fallow)	50
Barley (on stubble)	150
Barley (on fallow)	150
Summerfallow	200

3. Annual use of machines was based on the above cropping pattern.
4. The hay was expected to yield 2 tons per acre for the one cutting per year and was valued at $20.00 per ton.
5. Fertilizer (33-11-0) was applied to the hay at 200 lbs. per acre with an estimated cost of $70.00 per ton.
6. Value of land $125.00 per acre and taxes $1.00 per acre.
7. Interest rate on machinery, equipment, land, buildings and average operating capital is 7% per year.
8. Operator and skilled labour charged at $2.25 per hour and unskilled labour at $1.75 per hour.
9. Tractor and machine operating costs per hour based on information provided by Alberta Department of Agriculture.
10. Hours per acre for machinery based on 80% field efficiency.
11. Cultural operations associated with normal production of a crop used for the nurse crop are not included. Only the additional costs associated with the re-seeding of 60 acres of hay per year are included and are spread over the total of 300 acres.
12. The cash and operator labour harvest costs for baling and stacking the hay were adjusted linearly for yield variations above and below the reported 2 tons per acre when reported in Table B. For example, the cost of the baling and stooking operation was calculated as follows for the 2.6 tons per acre yield:

(2.6/2) x $1.67 = $2.17 equipment and materials
(2.6/2) x $ .81 = $1.05 operator's labor

13. Due to the use of tractors and the front end loader in livestock enterprises as well as on other crops, interest and depreciation costs were allocated on the basis of hours use per year rather than acreage covered.

Table 1 Summary of Consensus Report

Costs and Returns at 2T/acre Yield

	Per Acre		Per Ton	
Cash Cultural Costs	9.06		4.03	
Cash Harvest Costs at 2T/acre	5.50		2.75	
Cash Overhead Costs	2.59		1.30	
Total Cash Costs		17.15		8.58
Non-Cash Overhead	14.35		7.18	
Operator's Labour at 2T/acre	2.57		1.28	
Total Non-Cash Costs		16.92		8.46
Total Costs		34.07		17.04
Expected Returns 2T @ $20.00		40.00		20.00
Gross Cash Margin		22.85		11.43
Return to Risk and Management		5.93		2.97
Return to Operator's Labour Risk & Management		8.50		4.25
Return to Operator's Risk, Land, Labor and Management		17.25		8.63

Table 2

Gross Returns and Costs Per Acre at Various Yields and Prices

	Crop HAY (Alf. Brome) / Area ARA #3	Yield TON Per Acre						
		-30%	-20%	-10%	Average	+10%	+20%	+30%
		.8T	1.1T	1.4T	1.7T	2T	2.3T	2.6T
RETURNS PER ACRE	Price per TON							
	14.00	11.20	15.40	19.60	23.80	28.00	32.20	36.40
	16.00	12.80	17.60	22.40	27.20	32.00	36.80	41.60
	18.00	14.40	19.80	25.20	30.60	36.00	41.40	46.80
	20.00	16.00	22.00	28.00	34.00	40.00	46.00	52.00
	22.00	17.60	24.20	30.80	37.40	44.00	50.60	57.20
	24.00	19.20	26.40	33.60	40.80	48.00	55.20	62.40
	26.00	20.80	28.60	36.40	44.20	52.00	59.80	67.60
COSTS PER ACRE	Cash Cultural Costs	9.06	9.06	9.06	9.06	9.06	9.06	9.06
	Cash Harvest Costs	2.57	3.30	4.38	4.77	5.50	6.23	6.96
	Cash Overhead Costs	2.59	2.59	2.59	2.59	2.59	2.59	2.59
	Total Cash Costs	14.22	14.95	16.03	16.42	17.15	17.88	18.61
	Non-Cash Overhead	14.35	14.35	14.35	14.35	14.35	14.35	14.35
	Operator's Labor	1.54	1.80	2.06	2.31	2.57	2.82	3.08
	Total Costs	30.11	31.10	32.44	33.08	34.07	35.05	36.04

821-A

C.R.D. No. _____

Consensus Cols. - 1, 7, 8, 9
Table A

PRODUCTION COSTS
CROPS & FORAGE

Date March '71

Reg. Ec. J. Wilson Loree

County Rockyview

HAY (BALED) (Crop) 300 (Acres)

D.A. Al Reimer, Dave Zuker

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
OPERATIONS	Hours Per Acre		Cash and Labor Costs Per Acre							Total Cost Per Ac.
	Equip.	Labor	Operator	Hired	Fuel & Repairs	Materials Kind	Quantity	Cost/Unit	Cost	
Cultural			$	$	$			$	$	$
Plow (60acres/yr)	.10	.11		.19	.22					.41
Seed (60acres/yr)	.04	.04	.08		.01	Alf-Brome	9 lb/acre	.70/lb	1.26	1.27
Harrow (60)	.01	.01		.02	.28					.30
Fertilizer 1x	.05	.05	.10		.08	33-11-0	(200 lb/acre)	70.00/T	7.00	7.08
			.18					CASH CULTURAL COSTS		0.06
Harvest 1 cuttings										
Swath & Conditioner	.28	.30	.68		.62					.62
Bale & Stook	.33	.36	.81		.84	Twine	.0125/bale		.83	1.67
Front End Loader	.38	.40	.90		.57					.57
Stacking	.11	1.21		2.50	.14	Hay Restacked in Yard				2.64
			2.39					CASH HARVEST COSTS		5.50

Cash Overhead

Phone $40.00 Crop Insurance $_____ Stationary, etc. $50.00 — .30

Taxes 1 Years at $1.00/acre — 1.00

Rent $_____ Average Operating Capital at 7 % $ 336 — 1.12

Building Insurance $10.00 Labor Insurance $25.00 Machinery Insurance $15.00 — .17

CASH OVERHEAD COSTS — 2.59

	(5)	(6)	Overhead	(10)	
TOTAL CASH COSTS/ACRE	2.71	2.76	2.59	9.09	17.15
EXPECTED CASH RETURNS PER ACRE 2 Ton @ $20.00/Ton					40.00
GROSS CASH MARGIN					22.85

LABOR/HOUR
Operator - $ 2.25
Skilled - $ 2.25
Unskilled - $ 1.75

RETURNS/ACRE

Crop	Yield	Value
Hay	2 ton	@ $ 20.00
		@ $

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(19)

	Total Cost Per Acre $
TOTAL CASH COSTS PER ACRE (821-A, page 1), columns 5 + 6 + 10	17.15

AV. INVESTMENT PER ACRE TO STUDY CROP / FIXED COST PER ACRE

Item	Per Acre	Depreciation	Interest	
Land	$ 125.00	$ xx	$ 8.75	8.75
Crop Supplies	6.67	.33	.23	.56
Buildings	4.00	.10	.14	.24
Equipment	24.29	3.10	1.70	4.80
Total				

NON-CASH OVERHEAD	14.33
OPERATOR'S LABOR	2.57
TOTAL NON-CASH COSTS PER ACRE	16.92
(A) TOTAL COSTS PER ACRE	34.07
- Operator's Labor	
(B) = Total Cost less Operator's Labor $ 31.50	
- Interest on Land	
(C) = Total Cost less Operator's Labor and Interest on Land $ 22.75	
(D) EXPECTED GROSS RETURNS PER ACRE	40.00
RETURNS TO OPERATOR'S LAND, LABOR AND MANAGEMENT (D-C)	17.25
RETURNS TO OPERATOR'S LABOR AND MANAGEMENT (D-B)	8.50

Table B 1/ RETURNS PER ACRE TO OPERATOR'S LAND, LABOR AND MANAGEMENT AT VARIOUS YIELDS AND PRICES

COSTS PER UNIT (e.g. Bu.) AT VARIOUS YIELDS

Crop Hay (Alf.-Brome) — Yield TONS Per Acre
Area ARA #3 (1969)

	-30%	-20%	-10%	Average	+10%	+20%	+30%
	.8T	1.1T	1.4T	1.7T	2.0T	2.3T	2.6T
RETURNS PER ACRE — Price per TON							
14.00	-8.62	-5.15	-1.68	1.78	5.25	8.72	12.19
16.00	-7.02	-2.95	1.12	5.18	9.25	13.32	17.39
18.00	-5.42	- .75	3.92	8.58	13.25	17.92	22.59
20.00	-3.82	1.45	6.72	11.98	17.25	22.52	27.79
22.00	-2.22	3.65	9.52	15.38	21.25	27.12	32.99
24.00	- .62	5.85	12.32	18.78	25.25	31.72	38.19
26.00	.98	8.05	15.12	22.18	29.25	36.32	43.39
2/ (c) Total Cost - (Op Lab. & Land Int)	19.82	20.55	21.28	22.02	22.75	23.48	24.21
COSTS PER TON — Cash Cultural Costs	11.32	8.24	6.47	5.33	4.53	3.94	3.49
Cash Harvest Costs	3.21	3.00	2.88	2.81	2.75	2.71	2.68
Cash Overhead Costs	3.24	2.35	1.85	1.52	1.29	1.13	1.00
Total Cash Costs	17.78	13.59	11.20	9.66	8.58	7.77	7.16
Non-Cash Overhead	17.93	13.04	10.25	8.44	7.18	6.24	5.52
Operator's Labor	1.93	1.64	1.47	1.36	1.29	1.23	1.18
Total Costs	37.64	28.27	22.92	19.46	17.04	15.24	13.86

1/ For description of this table, see page 3.
2/ This row shows the total cost less operator labour & interest on land at the various yields.

C.R.D. No. _____

Consensus Cols. - 1, 2, 4, 5, 7, 12, 13, 14, 15

INVESTMENT SCHEDULE - Table C

821-C

County Rockyview (1) Crop HAY (BALED) (6) (7) Acres 300 (9) (10)

Reg. Ec. J. Wilson Loree

D.A. Al Reimer, Dave Zukerman

EQUIPMENT	Size	Cost Price (2)	Salvage Value (3)	All Crops Coverage Acres (4)	Study Crop Coverage Acres (5)	Study Crop Coverage % (5)	Life Yrs. (8)	Study Crop: Annual Costs Deprec.	Study Crop: Annual Costs Int.*	Study Crop: Annual Costs/Ac. Deprec	Study Crop: Annual Costs/Ac. Int.*	Power H.P. (11)	Acres/ Hour (12)	Cash Costs/Hour: Fuel (13)	Cash Costs/Hour: Repairs (14)	Cash Costs/Hour: Total** (15)
Grass Seed Attach.		$ 200	$ 20	60	60	100	20	$ 9.00	$ 7.70	$ .03	$ .03	45	5	$	$ .20	$ .20
Harrow	40'	1,000	0	980	120	12	20	6.00	4.20	.02	.01	45	22		.27	1.42
Swather	12'	3,500	350	760	300	40	10	126.00	53.90	.42	.18		3.5	.80	1.02	1.82
Conditioner		950	100	300	300	100	10	85.00	36.75	.28	.12		3.5		.35	.35
Baler PTO		2,800	900	460	300	65	6	205.83	84.18	.70	.28	85	3.0	.01	.66	2.43
Stooker (automatic)		700	200	460	300	65	6	54.16	20.48	.18	.07		3.0	.02	.09	.11
Plow	4 x 16"	1,500	150	60	60	100	20	67.50	57.75	.22	.19	85	2.0	.02	.38	2.16
Wagon		400	40	460	300	65	25	9.36	10.00	.03	.03	45	9.1	.01	.01	1.24
				HRS. / YEAR	HRS. / YEAR											
Tractor	85 HP	12,000	1,200	555	144	21	15	151.20	97.02	.50	.32			1.00	.76	1.76
Tractor	45 HP	7,000	700	400	155	39	15	163.80	105.11	.55	.35			.45	.70	1.15
Front End Loader		2,000	200	270	115	43	15	51.60	33.11	.17	.12	45	2.6	.01	.33	1.49

* Interest on Equipment 7 %

** Includes tractor complement where applicable.

FIXED COSTS TO STUDY CROP HAY (Crop)

LAND, BUILDINGS, EQUIPMENT, ETC.	Cost Price	Average Value	% to Crop	Life Yrs.	Fixed Costs on 300 Acres: Deprec.	Int.*	Other	Other	Total
Land (1 Years)	$ 120,000	$ xx	100	XX	$ XX	$ 2,640	$	$	$ 2,640.00
Supplies, Shop, Tools	6,000	3,000	100	20	100	70			170.00
Buildings	4,000	2,000	100	40	30	42			72.00
Equipment	32,050	17,955	XX	XX	929	510			1,439.00
TOTAL	162,050	22,955			1,059	3,262			4,321.00

* Interest on land, bldgs. 7 %

Cropland Acres		
Hay	300	Acres
Green Feed	60	Acres
Oats	100	Acres
Barley	300	Acres
S.F.	200	Acres
Total	600	Acres

PRODUCTION ECONOMICS BRANCH

ECONOMICS DIVISION